

**Features**

- Split Gate Trench MOSFET Technology
- High Density Cell Design for Low RDS(on)
- Moisture Sensitivity Level 1
- Halogen Free. "Green" Device (Note1)
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant(Note2) ("P" Suffix Designates RoHS Compliant. See Ordering Information)

**Maximum Ratings**

- Operating Junction Temperature Range : -55°C to +175°C
- Storage Temperature Range: -55°C to +175°C
- Thermal Resistance: 50°C/W Junction to Ambient (Note3)
- Thermal Resistance: 1.3°C/W Junction to Case

Parameter	Symbol	Rating	Unit
Drain-Source Voltage	V <sub>DS</sub>	40	V
Gate-Source Voltage	V <sub>GS</sub>	±20	V
Continuous Drain Current	I <sub>D</sub>	T <sub>C</sub> =25°C	180
		T <sub>C</sub> =100°C	127
Pulsed Drain Current (Not4)	I <sub>DM</sub>	720	A
Total Power Dissipation (Note5)	P <sub>D</sub>	115	W
Single Pulse Avalanche Energy (Note6)	E <sub>AS</sub>	441	mJ

Note:

1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

2. High Temperature Solder Exemption Applied, see EU Directive Annex 7(a)-I.

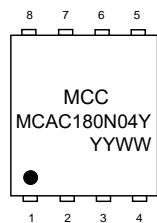
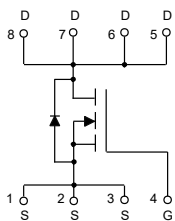
3. The value of R<sub>θJA</sub> is measured with the device mounted on 1in<sup>2</sup> FR-4 board with 2oz. Copper, in a still air environment with T<sub>A</sub>=25°C.

4. Repetitive rating; pulse width limited by max. junction temperature.

5. P<sub>D</sub> is based on max. junction temperature, using junction-case thermal resistance.

6. E<sub>AS</sub> is based on max. junction temperature, using junction-case thermal resistance.

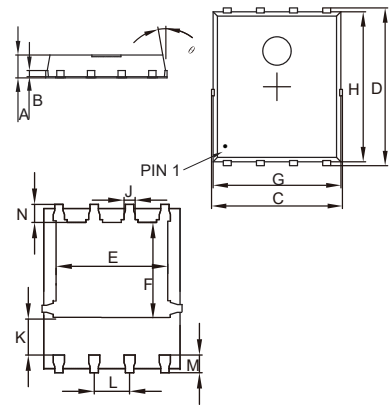
**Internal Structure and Marking Code**



4 codes in total  
YY is the year  
WW is the week

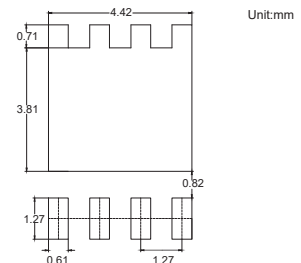
**N-CHANNEL  
MOSFET**

**DFN5060**



DIM	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.031	0.047	0.80	1.20	
B	0.010		0.254		TYP.
C	0.193	0.222	4.90	5.64	
D	0.232	0.250	5.90	6.35	
E	0.148	0.167	3.75	4.25	
F	0.126	0.154	3.20	3.92	
G	0.189	0.213	4.80	5.40	
H	0.222	0.239	5.65	6.06	
K	0.045	0.059	1.15	1.50	
J	0.012	0.020	0.30	0.50	
L	0.046	0.054	1.17	1.37	
M	0.012	0.028	0.30	0.71	
N	0.016	0.028	0.40	0.71	

**Suggested Solder Pad Layout**



**Electrical Characteristics @ 25°C (Unless Otherwise Specified)**

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	40			V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V$			1	$\mu A$
Gate-Source Leakage Current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 20V$			$\pm 100$	nA
Gate-Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.0	3.1	4.0	V
Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$		1.5	2.0	m $\Omega$
Gate Resistance	$R_G$	f=1MHz, Open Drain		1.5		$\Omega$
<b>Diode Characteristics</b>						
Maximum Body-Diode Continuous Current	$I_S$				180	A
Diode Forward Voltage	$V_{SD}$	$V_{GS}=0V, I_S=20A$			1.2	V
Reverse Recovery Time	$t_{rr}$	$I_F=55A, di/dt=100A/\mu s$		58		ns
Reverse Recovery Charge	$Q_{rr}$			52		nC
<b>Dynamic Characteristics</b>						
Input Capacitance	$C_{iss}$	$V_{DS}=20V, V_{GS}=0V, f=1MHz$		4383		pF
Output Capacitance	$C_{oss}$			1435		
Reverse Transfer Capacitance	$C_{rss}$			29		
Total Gate Charge	$Q_g$	$V_{GS}=10V, V_{DS}=20V, I_D=55A$		56		nC
Gate-Source Charge	$Q_{gs}$			27		
Gate-Drain Charge	$Q_{gd}$			5.5		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS}=10V, V_{DD}=20V, I_{DS}=55A, R_{GEN}=3\Omega$		22		ns
Turn-On Rise Time	$t_r$			8.6		
Turn-Off Delay Time	$t_{d(off)}$			44		
Turn-Off Fall Time	$t_f$			51		

**Curve Characteristics**

Fig. 1 - Typical Output Characteristics

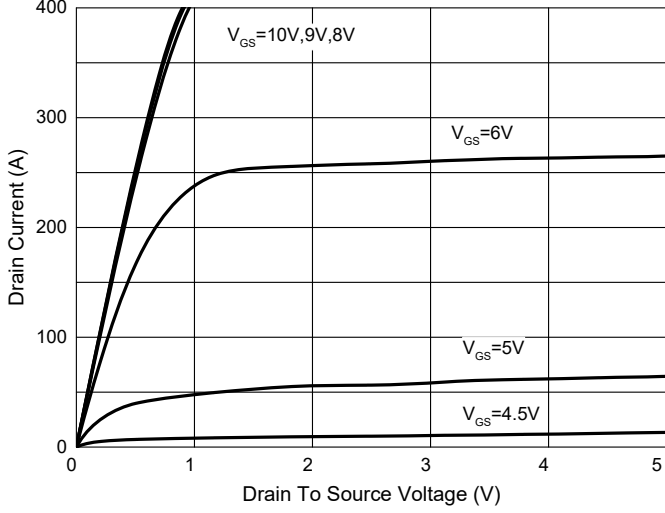


Fig. 2 - Transfer Characteristics

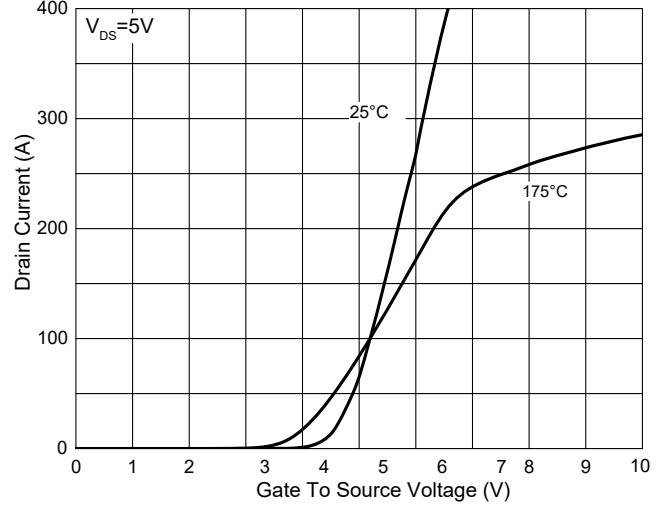


Fig. 3 -  $R_{DS(ON)} - V_{GS}$

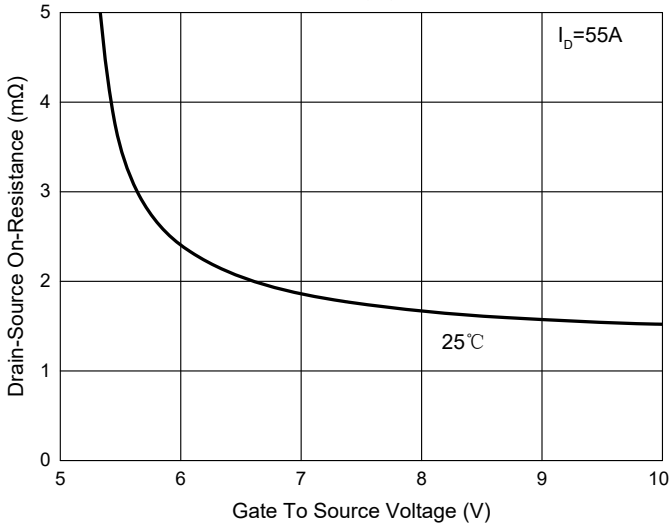


Fig. 4 -  $R_{DS(ON)} - I_D$

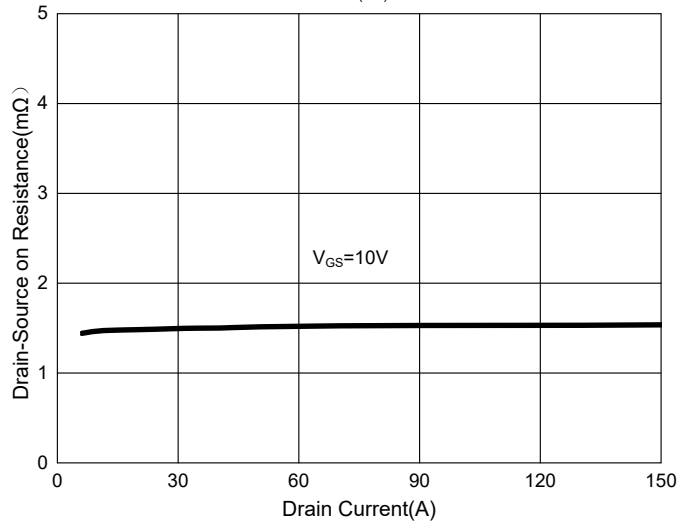


Fig. 5 - Capacitance Characteristics

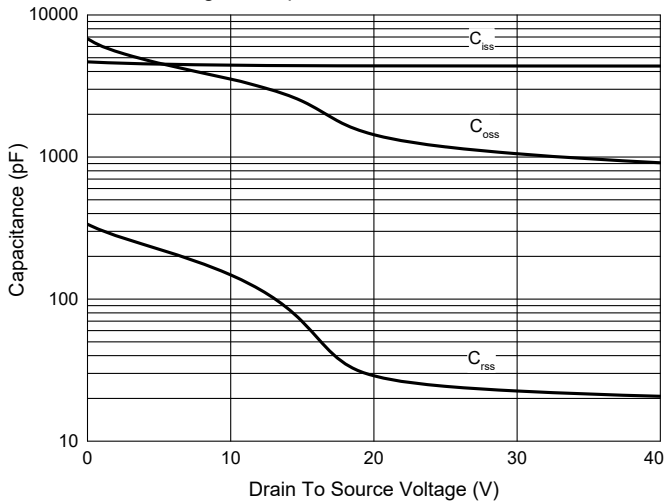
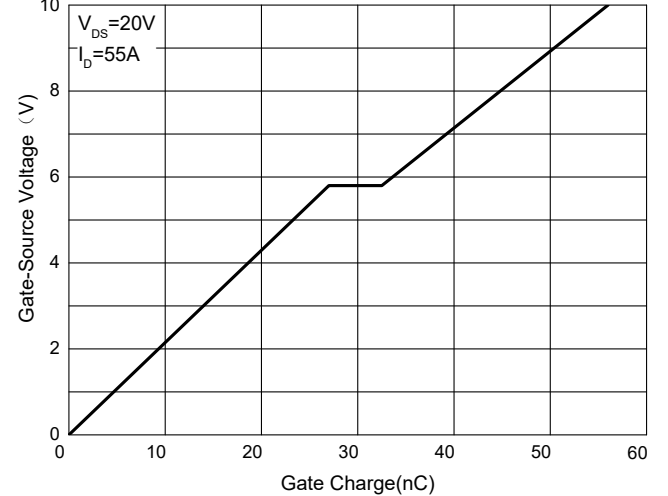


Fig. 6 - Gate Charge



**Curve Characteristics**

Fig. 7 - Normalized Threshold Voltage

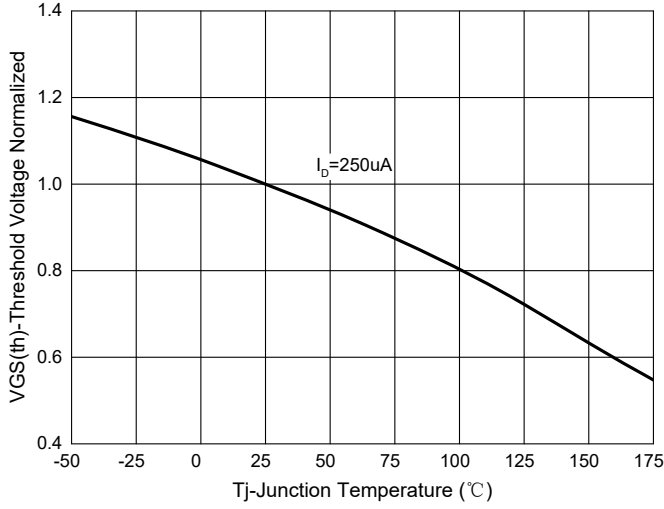


Fig.8-Normalized On Resistance Characteristics

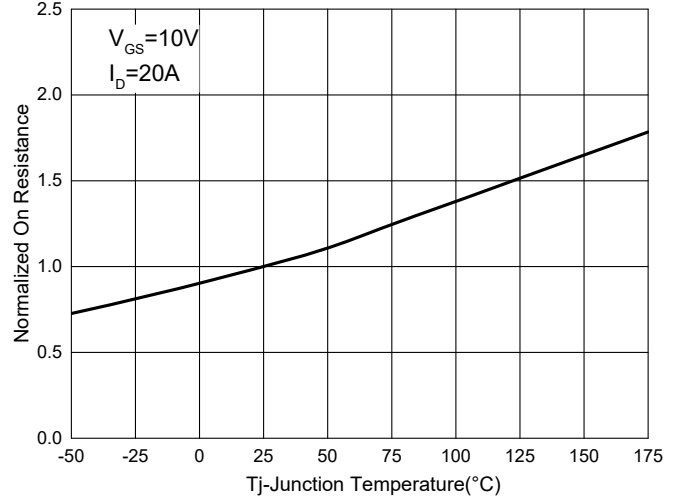


Fig.9 -  $I_s - V_{SD}$

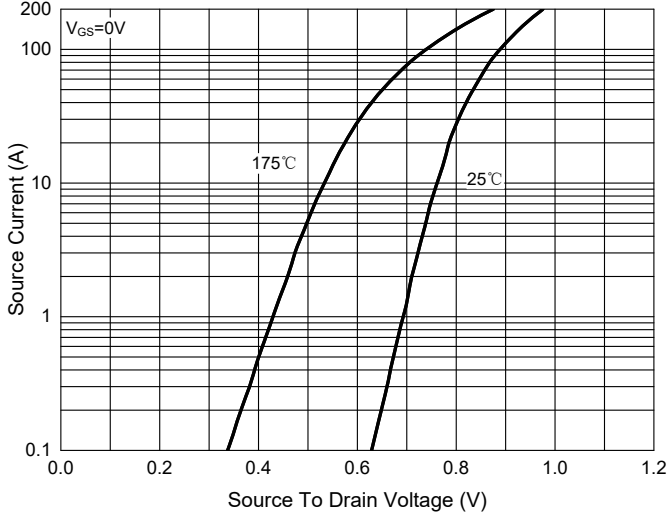


Fig. 10 - Drain Current

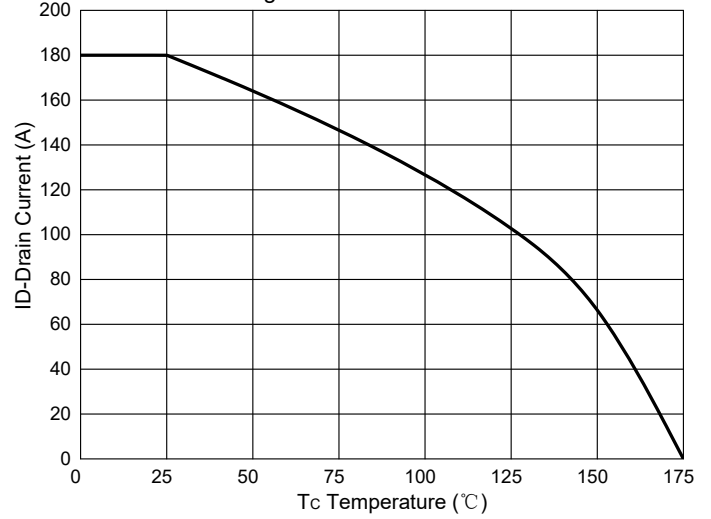
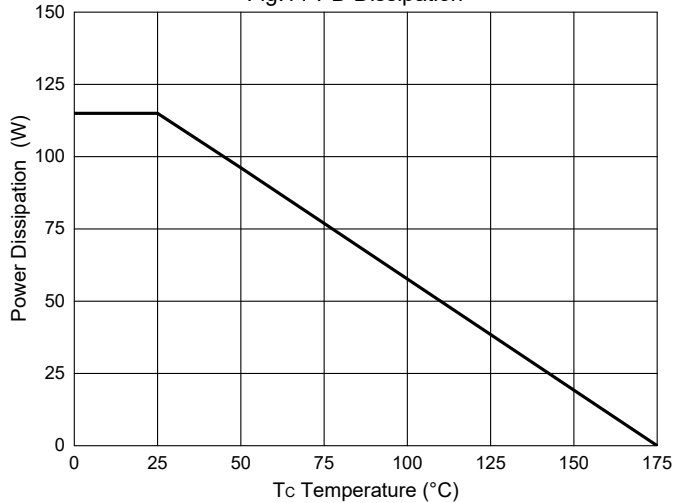


Fig.11-PD Dissipation



Curve Characteristics

Fig. 12 - Safe Operation Area

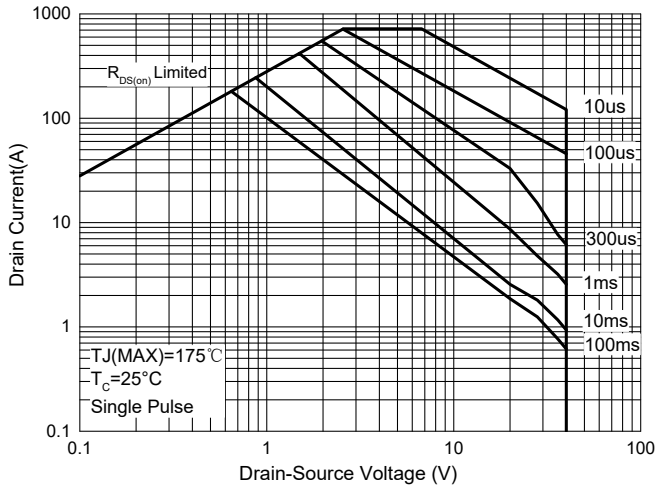
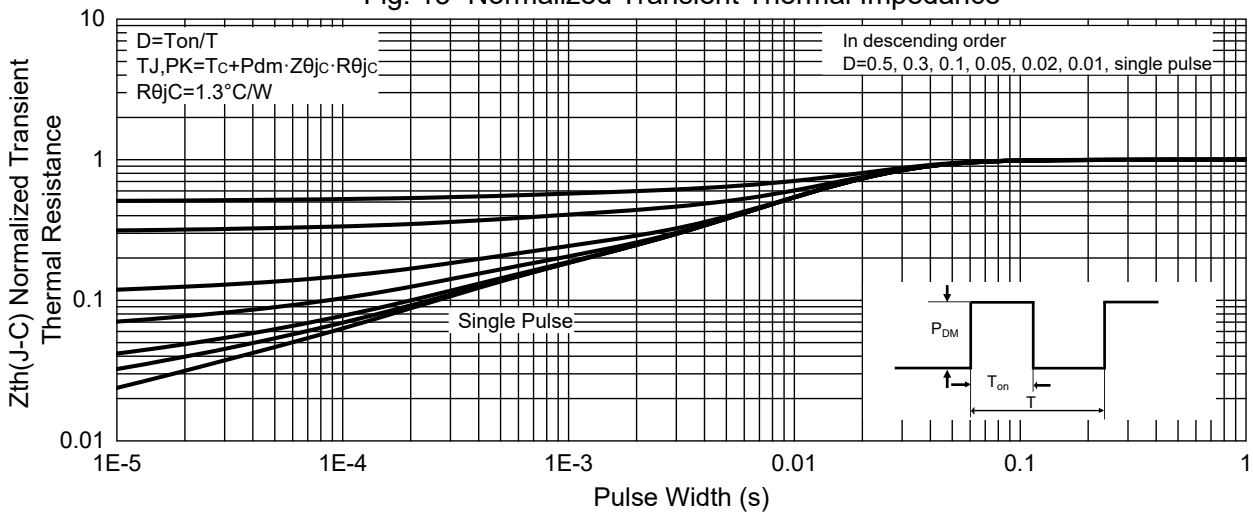


Fig. 13 - Normalized Transient Thermal Impedance



## Ordering Information

Device	Packing
Part Number-TP	Tape&Reel: 5Kpcs/Reel

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